WxFx

Climatological Weather Effects

ASNE Technical Exchange Meeting

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Primary Goals

- WxFx Climatology
- ESG 10 year ACMES derived database
- Improve upon existing software
- GIS Based Platform
- Networked or field deployed system

Initial Approach

- Evaluate existing WxFx software systems
- 10 year climatological analysis of rules
- Direct interface to ESG's FDR server
- Utilize a powerful GIS API (e.g. ArcGIS Engine from ESRI)
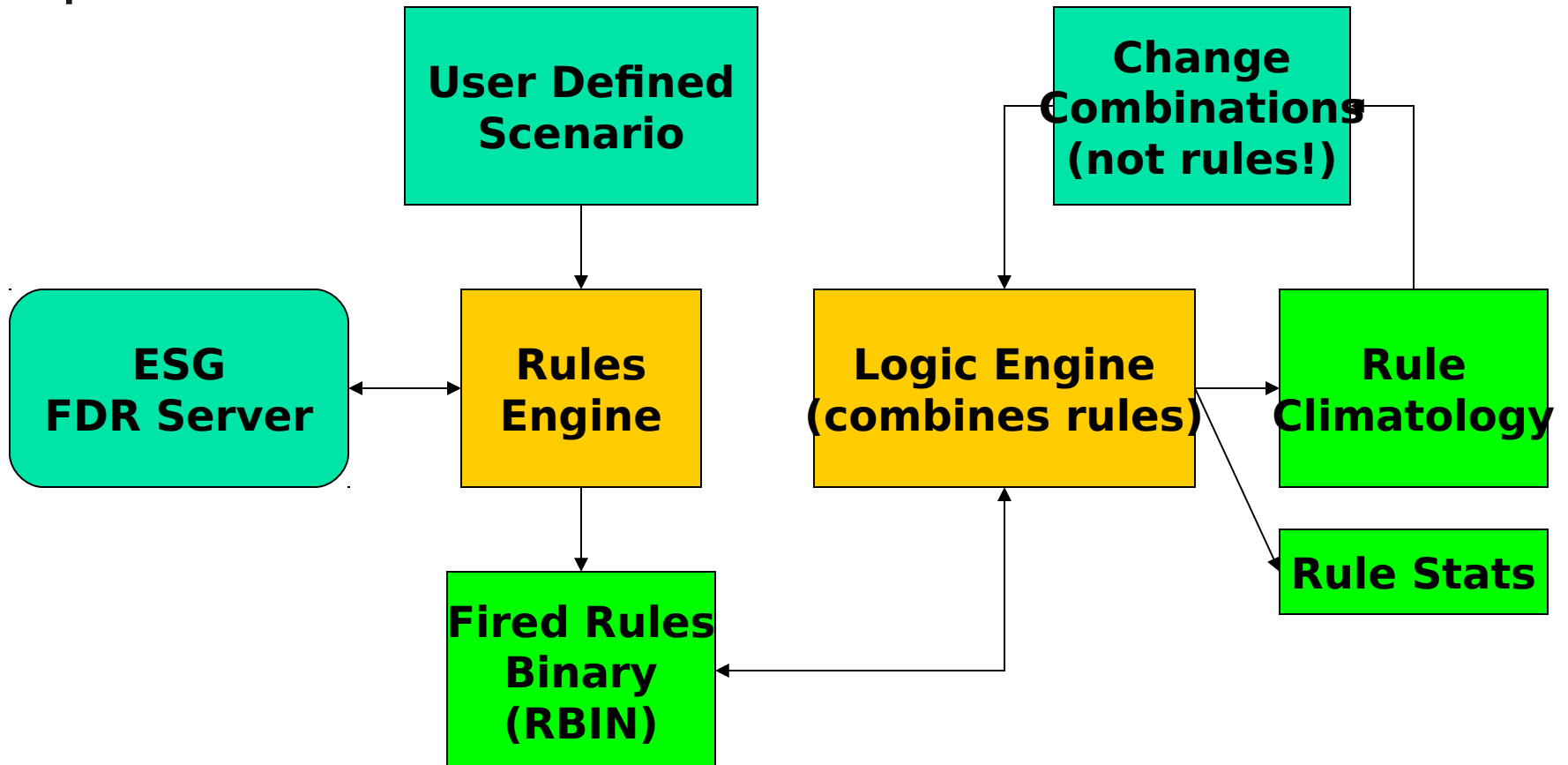
Climatology Products

- Fire specific scenario of rules for long term weather data
- Store data in temporal bit stream data files "pre-fired rules binary" or RBIN
- One RBIN per rule, or sets of RBINs in hypercube format for speedy access
- Logic blocks will provide rules combinations from temporal RBIN data
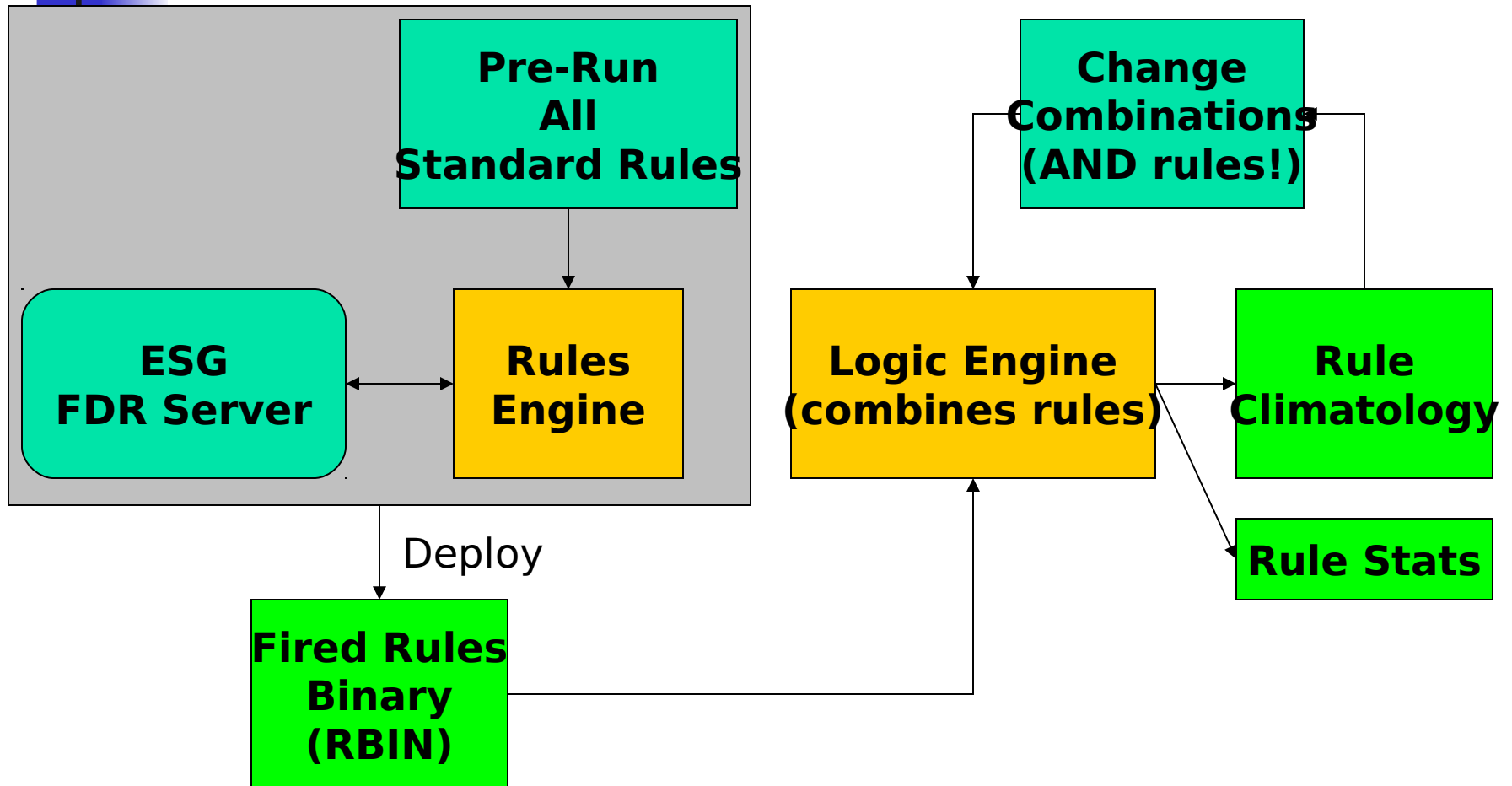
System Flow 1

User Defined Scenario

Change Combinations (not rules!)

ESG FDR Server

Rules Engine

Logic Engine (combines rules)

Rule Climatology

Fired Rules Binary (RBIN)

Rule Stats

System Flow 2

Pre-Run All Standard Rules

Change Combinations (AND rules!)

ESG FDR Server

Rules Engine

Logic Engine (combines rules)

Rule Climatology

Deploy

Fired Rules Binary (RBIN)

Rule Stats

System Flow 3

User Defined Rules

ESG FDR Server

Rules Engine

Logic Engine (combines rules)

Rule Climatology

Fired Rules Binary (RBIN)

Rule Stats

Fired Rules Binaries (RBIN)

For each grid point:

R001	1 1 1 0 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 ...
R030	0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 ...
R064	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ...
R075	1 1 1 0 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 ...
R112	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 ...
R114	0 1 0 0 1 1 1 1 0 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 ...

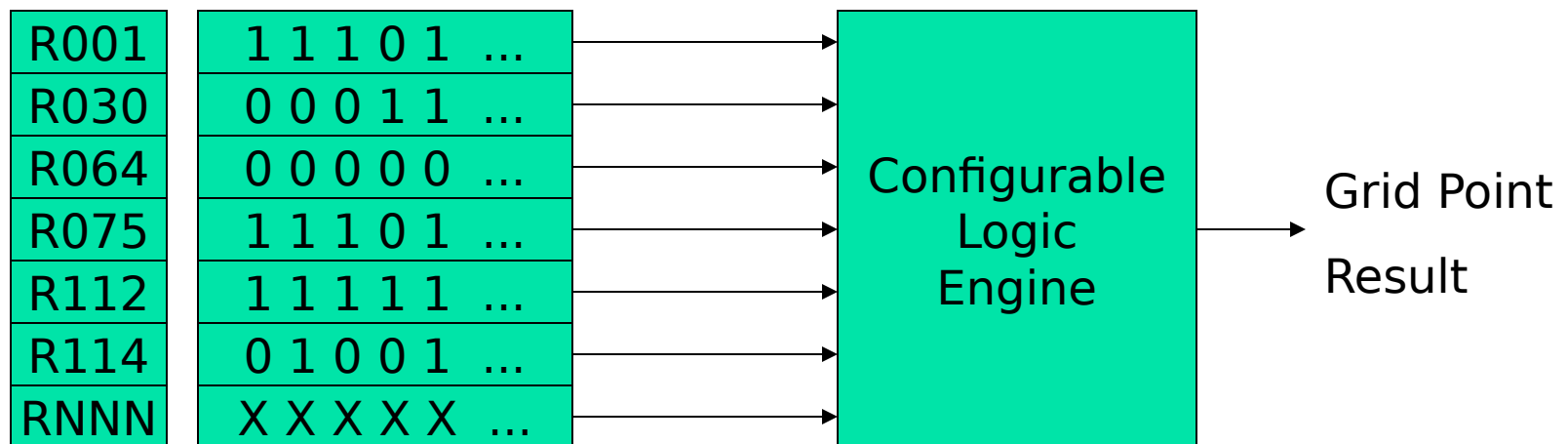| RNNN | X X X X X X X X   X X X X X X X X   X X X X X X X X ... |

Time
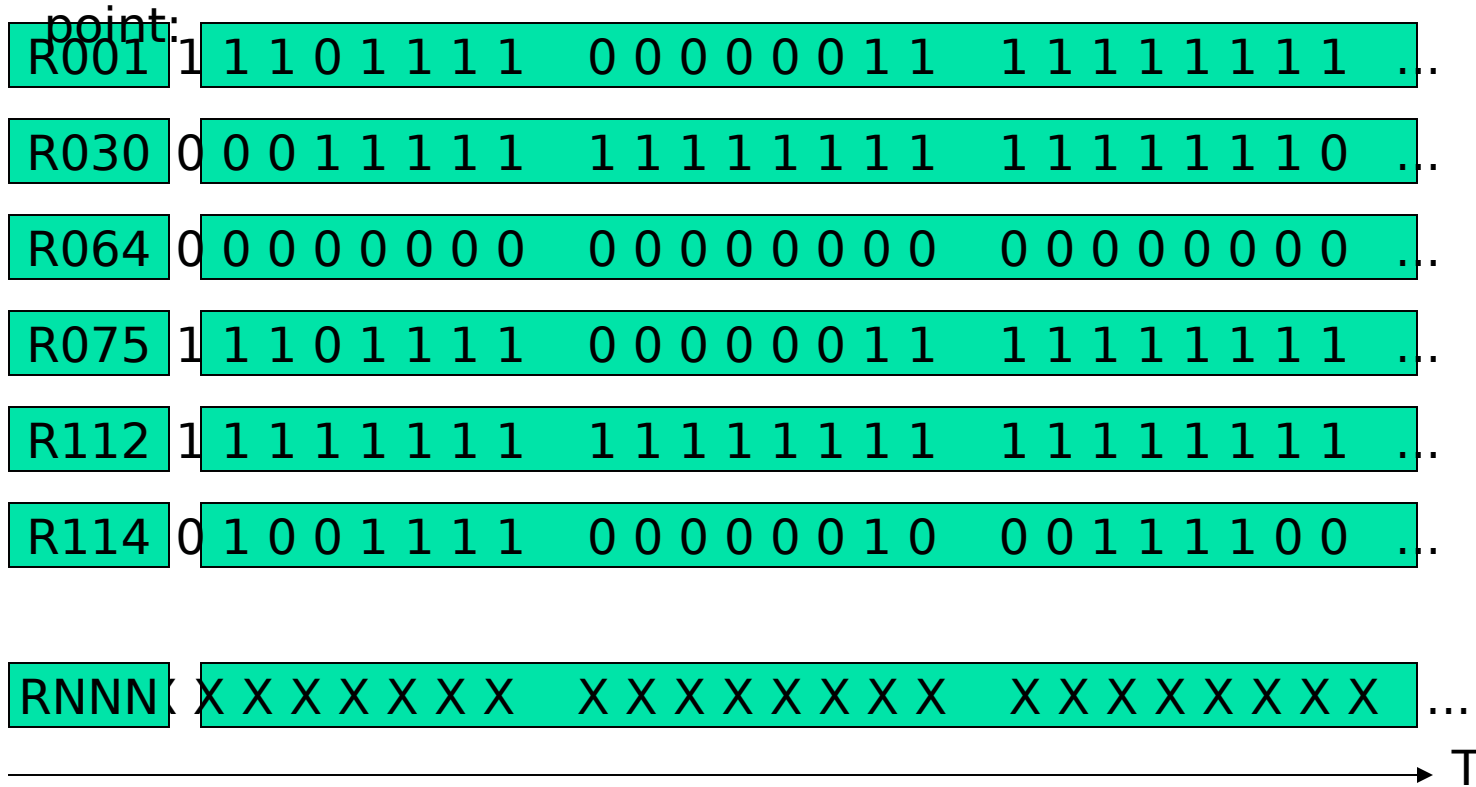
RBIN Sizes

- 8 x 365 x 40 x 40 = 4672000 bits
- 584000 bytes packed (1 year, 1 rule)
- About 300 Mb for 500 rules
- 1825000 bytes for 500 rules (1 grid pt)

Logic Engine

- Similar to digital logic circuit
- Reconfigurable
- Fast Execution

R001	1 1 1 0 1 …
R030	0 0 0 1 1 …
R064	0 0 0 0 0 …
R075	1 1 1 0 1 …
R112	1 1 1 1 1 …
R114	0 1 0 0 1 …
RNNN	X X X X X …

Configurable Logic Engine

Grid Point Result

Current Tasks

- Development using FDR server
- Evaluate WxFx software
- Simple rule FDR server benchmarking
- Develop with ESRI ArcGIS Engine